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STUDIES IN SELECTION LEARNING I:

The Effect of Selection Processes on Acquisition and Retention

Technical Report

No. 1

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SUMMARY

The purpose of this study was to examine a type of learning called selection learning. The paradigm of selection learning has the following characteristics: Individuals are presented with a list of items to learn. Interspersed among these items are a number of incidental items which are to be ignored. The intentional items are characterized by an attribute called the selection cue, which permits them to be discriminated from the incidental items. Selection learning differs from ordinary verbal rote learning in that the latter procedure does not utilize any incidental items.

In an exploratory experiment no differences in acquisition between selectors and rote learners were obtained. After one hour of interpolated activity, however, selectors retained significantly more items than subjects who learned under the traditional rote learning procedure.

It was hypothesized that there exist two factors in selection learning which cancel each other in acquisition, thus preventing differences in performance from appearing. One factor, facilitation of learning, was hypothesized to be a direct function of the informativeness of the selection cue. The other, interference with recall of international items was hypothesized to vary directly with the amount of learning of incidental items. It was further hypothesized that the effects of interferences dissipate more rapidly than the effects of facilitation.

INTRODUCTION

In verbal learning experiments the subject is generally presented with a set of items all of which are to be learned by him. Although there exist various methods of presenting the items, the feature of the verbal learning paradigm critical for the present purposes is that the subject need not make decisions about which items he is to learn and which to ignore. The items are pre-selected by the experimenter. On the contrary, in the everyday learning situation the individual is confronted with a large array of stimulation of which only a fraction is crucial to his learning. The learner must be able to select from this array the appropriate items. It is this type of learning, called selection learning for the present purposes, that we wish to analyze in this series of studies.

Specifically, selection learning refers to acquisition and retention under the following conditions: Individuals are presented with a list of items to learn. Interspersed among these items during each trial is a number of other items which are not to be learned. Let us refer to the former as the intentional, and to the latter as the incidental items. The items to be learned are characterized by at least one attribute which permits the indivudals to discriminate them from the items to be ignored. This is the selection cue. While there may be many attributes which distinguish one set of items from another, a selection cue is that attribute which the person uses in choosing what items are to be learned.

Selection learning, thus, is quite similar to the traditional rote learning paradigm except for the fact that incidental items are interspersed among the intentional items, and that the subject is capable of discriminating between them. There are two important ways in which

selection learning may be distinguished from traditional rote learning. First, the person must actively choose on the basis of the selection cue what is to be learned. Second, regardless of intentions, the person is likely to learn some of the incidental items. That is to say, the opportunity for incidental learning is much greater under selection learning conditions than under ordinary rote learning or non-selection where only intentional items are presented. Furthermore, intentional and incidental learning occur concomitantly. Selection learning, thus, also has elements in common with incidental learning situations. However, while the emphasis in the former is on the acquisition and retention of intentional items, the emphasis in the latter is on acquisition and retention of incidental items. These distinguishing characteristics suggest that selection learning may have different consequences for acquisition and retention than the traditional rote learning procedure. The purpose of the present studies is to examine the acquisition and retention under conditions of selection learning.

Acquisition Under Selection Learning Conditions

Incidental learning. In selection learning, incidental and intentional learning occur concomitantly. In order to predict the individual's performance in selection learning, the consequences of incidental learning for intentional learning must be known. Unfortunately, on just this point there is a paucity of evidence. In classical conditioning incidental stimuli are a common source of performance decrement called external inhibition (Razran, 1939), but there are gross differences between classical conditioning and verbal learning. Of greater relevance are the findings of Postman and Adams (1956a) showing that in a retroactive interference design, incidental learning does interfere with intentional learning. On the other hand, in a proactive interference design

incidental learning had no significant interference effects on intentional learning. Postman and Adams' experiment on retroactive effects seems to be the only direct evidence that incidental learning can interfere with intentional learning. However, Bahrick (1957) found no relationship between the learning of intentional items and their associated incidental stimuli.

The occurrence of incidental learning under selection conditions implies that the set of learnable items is larger than in cases where only the intentional items are presented. Binet and Henri (cf., Woodworth, 1938) and Woodworth (1938) demonstrated that the larger the list of learnable items, the poorer the learning in terms of percent of the total set learned but the better the learning in terms of absolute number of items acquired. If in a selection situation the person is required to recall as much of the array as he can--intentional and incidental items--it is likely that he would produce a larger total number of items than a non-selector. This must occur in order to be consistent with the findings of Binet and Henri and of Woodworth. Yet if the incidental items were eliminated from his record, would the difference still exist? A major problem, which will be dealt with later, centers on what proportion of total recall will be composed of incidentally learned items.

The selection cue. No studies of verbal learning are available which explicitly manipulate a selection cue in a selection learning paradigm. The studies which come closest to dealing with the cue properties of the learning material are those on isolation and crowding of the intentional items. These are explicitly concerned with the relationship between item discriminability and learning.

If the intentional items differ only slightly from the incidental items, then differential attention and learning would be difficult. In verbal learning there is considerable evidence to indicate that increasing discriminability among items in a series serves to reduce errors and facilitate learning (Gibson, 1940). Von Restorff (cf. Osgood, 1953), Siegel (1943) and Postman and Phillips (1954) found that if several dissimilar or isolated items are imbedded in a list of similar or crowded items, errors are reduced especially at those points where the dissimilar items occur. As the number of isolated items is increased, the advantage is gradually reduced, although there is some advantage even when half the items are of a different type (Pillsbury and Rausch, 1943).

The experiments on item discriminability, however, did not involve the differential attention and learning that are crucial in a selection situation. The array of items in these studies did not include incidental stimuli which were to be ignored. The discriminability only involved items that were to be intentionally learned. However, these results indicate that the more discriminable the items, the less intra-list confusion and the fewer errors in learning. On this basis alone it might be expected, therefore, that in selection learning, acquisition may be improved when the difference between intentional and incidental items is increased.

Retention of Items Learned Under Selection Conditions

Individuals learning under selection conditions must work differently from those under ordinary rote learning procedures. The different conditions of work may establish different sets. Lewin's experimentation on the interaction of set and performance (cf. Koffka, 1935, pp. 578-582) suggests

that tasks such as selection learning and ordinary rote learning may generate different sets. When these sets are transferred to a situation where memory is being tested, they may have different consequences. Under selection learning, a set to discriminate the incidental from the intentional items may be established. While under ordinary rote learning conditions, a set to reproduce the items may be dominant. This can make for little difference in acquisition. Nevertheless, it seems probable that if subjects are asked to recall what they had learned some time after practice, those who developed a discrimination set are more likely to think of the discriminative attribute of the item than those who had labored under a set to reproduce. The evocation of the discriminative attribute in the memory test is likely to have a facilitative effect on retention, since during practice it had been closely associated with the intentional items. Thus, on a contiguity basis alone, the evocation of the selection cue may facilitate recall of the intentional items. But more importantly, Woodworth (1938, p. 37) has shown that in recall a person tends to emit responses which are similar to the correct response during the interval before the correct response is given. It is as if the individual is searching in memory, categorizing, recategorizing and eliminating alternatives. The evocation of the selection cue may circumvent and delimit much of this implicit trial and error and quickly denote for the person a relatively narrow category of alternatives. Thus, if the discriminative attribute is evoked, the memory search is likely to be faster and more accurate. Since this cue evocation process is more probable by transfer of the discrimination set than by transfer of the reproduction set, it would follow that selectors may manifest better memory for the intentional items than non-selectors.

Incidental learning of items which are similar to the intentional items may produce competing associations. Some evidence has been presented in the discussion of acquisition which indicated that incidental learning may act as a source of interference for intentional learning (Postman and Adams, 1956a). The question must be raised, however, of whether intentional and incidental items are forgotten at the same rate. McGeoch (1942, p. 143) indicated that interfering, incidental or incorrect associations drop out or fall below threshold at a faster rate than the correct, intentionally learned associations following practice. This was hypothesized in order to explain the phenomena of reminiscence and distribution of practice. He states that "...since conflicting associations... (are)...less well fixated than the right ones, they should be forgotten sooner..." (McGeoch, 1942, p. 143). In line with McGeoch's assumption that reminiscence is at least partially due to the dissipation of interference accumulated in learning, Hovland (1938) tested for reminiscence following learning by massed and by spaced practice where presumably interference would dissipate between trials. Greater reminiscence was found following learning by massed practice. Also, Postman and Adams (1957) have found that a two minute rest after reaching a partial learning criterion reduces the number of trials needed to attain a criterion of perfect learning. The analysis of the post-criterion trials reveals a sharp decrease in the number of errors following rest. This beneficial effect of rest is said to result from the dissipation of the associative interference built up during practice. The improvement in retention following the dissipation of interference depends on the amount of interference built up during practice. The more interference generated, the more performance in retention should be benefited by its dissipation. If incidental learning

produces interference, the selectors should be confronted with more interference than ordinary rote learners. It follows that the retention of selectors will benefit more by an interpolated interval in which the dissipation can occur than that of those under conditions with low probability of incidental learning. Thus, a difference in retention can be predicted on the basis of the differences in amount of incidental learning likely to occur under selection and non-selection conditions. This prediction, of course, rests on the assumptions that (a) incidental learning is more likely to occur under selection learning, (b) this incidental learning creates interference, and (c) the interference dissipates after practice.

Conclusions

An analysis has been made of a complex discrimination and learning situation described as selection learning. It was pointed out that certain aspects of selection learning have much in common with the traditional paradigms of rote and incidental learning. Much of the past work in rote learning indicates that acquisition under selection conditions will vary directly with the discriminability of the items. However, since ordinary rote learning does not involve differential attention and learning, this generalization to selection learning has tenuous validity. Moreover, past experimentation does not give indications of what may result through the use of selection cues which differ in ways other than producing different degrees of discriminability between intentional and incidental items. Active utilization of the selection cue in choosing what is to be learned is the hallmark of selection learning. Any consequences of this process byond that of discriminability effects would be peculiar to the selection paradigm. And about such consequences, the evidence from rote learning experimentation is limited.

Incidental learning in selection occurs concomitantly with intentional learning. There is some support for supposing that such incidental learning generates interference. If this supposition is valid, it may have important implications for retention after selection learning. According to McGeoch's hypothesis, in the interval between the last practice trial and the test of memory, the interference dissipates. Thus, after the interval, individuals formerly characterized by a high level of interference may demonstrate better retention of what was learned than individuals with a low level of interference during acquisition.

These are conjectures as to what are likely to be the consequences of selection learning for the acquisition and retention of the intentional items. They are formed on the basis of partial and incomplete evidence. Obviously under such conditions no valid conclusions can be drawn regarding acquisition and retention of materials learned by selection processes. Since this is the case, the first step in coming to grips with selection learning is to conduct exploratory experimentation in which the problem is explicitly examined.

AN EXPLORATORY STUDY OF SELECTION LEARNING

It was suggested above that selection learning differs from ordinary rote learning in two ways. Selection learning involves a process of discrimination of intentional from incidental items by a selection cue as well as interference due to incidental learning. It is possible, therefore, that selection learning, by possessing such properties, has different consequences for acquisition and retention than ordinary rote learning. The purpose of this study is to compare selection and ordinary rote learning in terms of acquisition and retention.

METHOD

Subjects. All Ss were obtained from the elementary psychology courses at The University of Michigan. Of the 62 Ss, 45 were women. None of the Ss had past experience in psychological experimentation. In participating, Ss fulfilled a course requirement. They were randomly assigned to separate experimental conditions. In the present experiment and in all of the studies to be reported later each S participated only once in any of the given experimental conditions.

Learning material and experimental groups. All Ss were to learn 10 numbers presented auditorily to groups of eight to sixteen Ss by means of a tape recorder. Each number was composed of two odd digits and one even digit (e.g., 743). Under the selection (S) condition the 10 intentional numbers were randomly interspersed with 10 incidental numbers each consisting of three even digits (e.g., 642). The numbers are shown in Table 1.

TABLE 1

Intentional Items	Incidental Items
327	246
381	260
523	268
549	402
729	482
741	624
763	680
947	826
965	864
983	842

In the non-selection (N) conditions, corresponding to ordinary rote learning, Ss were only presented the 10 intentional numbers. Two sub-conditions were utilized in non-selection. In one sub-condition, called massed (Nm), the items were presented at regularly spaced 3.5 second intervals. In the second sub-condition, called spaced (Ns), the items appeared at irregular intervals. For this latter condition the items were arranged so that they corresponded in temporal spacing to the same items presented under S conditions. Thus where Ss in the S group were confronted with incidental items, Ss in the Ns group had a blank interval. The length of this blank interval was equivalent to the amount of time required for the presentation of the incidental items at a particular point in the corresponding trial for the S group.

Procedure in acquisition. All groups received 10 trials. To control for serial effects, the order of presentation was varied randomly over all tirals. Except for the Ns groups, the interval between all items was approximately 3.5 seconds. After each trial Ss were given 1 minute of free recall in which they were to write down as many of the intentional items as they could recall. At the end of the 1 minute period Ss were warned by a voice on the tape recorder to stop writing and get ready for the next trial.

After the Ss had assembled and each had taken his seat at an individual talbe, they were told that they were to take part in a simple experiment which consisted of learning a list of three-digit numbers presented over a tape recorder. The list would be played over 10 times. Each time the same numbers would appear, but their order in the list would vary. It was stressed that there was no special order in which they were to be learned or recalled. After listening to each presentation of the numbers, at a "Go ahead" signal heard on the tape recorder, they were to

write down as many of the intentional numbers as they could recall. For this purpose a package of 15 sheets was given to each S. Each sheet had a column of 10 horizontal 2-inch lines in the center which covered its length.[1]

After 1 minute of free recall a voice on the tape recorder would tell them to stop writing and take up an unused sheet. At this signal they were also to take the used sheet, turn it face down and place it to the side of the table. Then upon placing the new unused sheet before them, they were to write the number of the trial in the upper right corner. After this Ss were to prepare to listen to the next trial which was to begin 5 seconds after they were warned to stop writing and take another sheet. The presentation of the numbers was always preceded by an announcement telling the number of the trial being given. If any S learned all of the numbers before the 10 trials were completed, they were to continue listening to the numbers as they were presented and writing them down during the free recall interval until the fixed number of trials were completed.

In addition to these general instructions, the following specific information was given in the three experimental conditions. In the S condition Ss were told that 20 numbers would be presented on each trial. Each of these numbers would be constructed of three digits. But they were to learn only those numbers which contain two odd and one even digit. Ten of the 20 numbers would be of this form. They were, thus, to learn only these 10 numbers. The Ss in the two sub-conditions of non-selection,

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[1] It was said that more than enough sheets were provided as a customary precaution in case some had come through the mimeograph machine imperfectly. This explanation regarding the extra sheets was to inhibit any thoughts Ss might have that there were to be more than the ten announced recall trials, and thus not anticipate the recall trial.

Nm and Ns, received identical instructions. They were told that 10 numbers would be presented on each trial and that they were to learn as many of these numbers as they could. These 10 numbers were identical to the 10 intentional numbers presented under the selection condition. In addition, it was necessary to control for the fact that the S group possessed some knowledge about the structure of the intentional items--that they were constructed of two odd and one even digit--which not only served as a selection cue but also provided information about what was to be learned and recalled. This knowledge could very well inhibit errors and improve recall independent of its cue function. As a control, therefore, the Ss in both non-selection groups were told that all 10 items were constructed of two odd and one even digit. This announcement was reinstated immediately at the end of every presentation of the list by the following message over the tape recorder: "That is all...Remember, the numbers you were to learn contain two odd and one even digit...Go ahead." This message immediately preceded the written free recall period in the S, Ns and Nm conditions. In the instructions preceding the acquisition trials Ss were told, as a rationale, that this message served to reduce errors by reminding them not to write down any number which did not contain two odd and one even digit.

Procedure in retention. After the tenth learning trial Ss were told to put the used recall sheets, which had been placed face down on the table, on the floor next to the table. They were then informed that there was a second part to the experiment which was designed to study their ability to learn and retain verbal material. The two parts of the experiment together would indicate how numerical learning is related to verbal learning. This explanation served as a rationale for introducing

a verbal learning task which constituted the interpolated activity between the last practice trial and the test of retention. Each S was then given a juvenile case study to read, "The Case of Johhny Sandron." This material was adapted from an actual study (Evans, 1948). The Ss were then instructed to read the case study at their own speed and to try to learn as many facts about Johnny and the causes of his delinquency as they could. They were to continue reading the case over as many times as possible until told to stop. Under each condition of learning one group of Ss performed the interpolated task for 15 minutes (subscript "15" in Table 2) and another for 60 minutes (subscript"60"). The number of Ss in each group is shown in Table 2.

TABLE 2

Group	Men Ss	Women Ss
S_{15}	2	8
S_{60}	2	7
Nm_{15}	1	7
Nm_{60}	3	6
Ns_{15}	6	10
Ns_{60}	3	7

At the end of the interpolated activity Ss were told to stop reading and to put the case study material on the floor. Instructions were then given to take one of the remaining unused recall sheets and to write down as they had done earlier as many of the numbers they learned in the first part of the experiment as they could recall. There was no reinstatement of the cue property during the test of retention. The Ss were allowed 90 seconds to record their recall. Afterwards all the recall sheets were collected and a complete description of the experiment was given to the Ss.

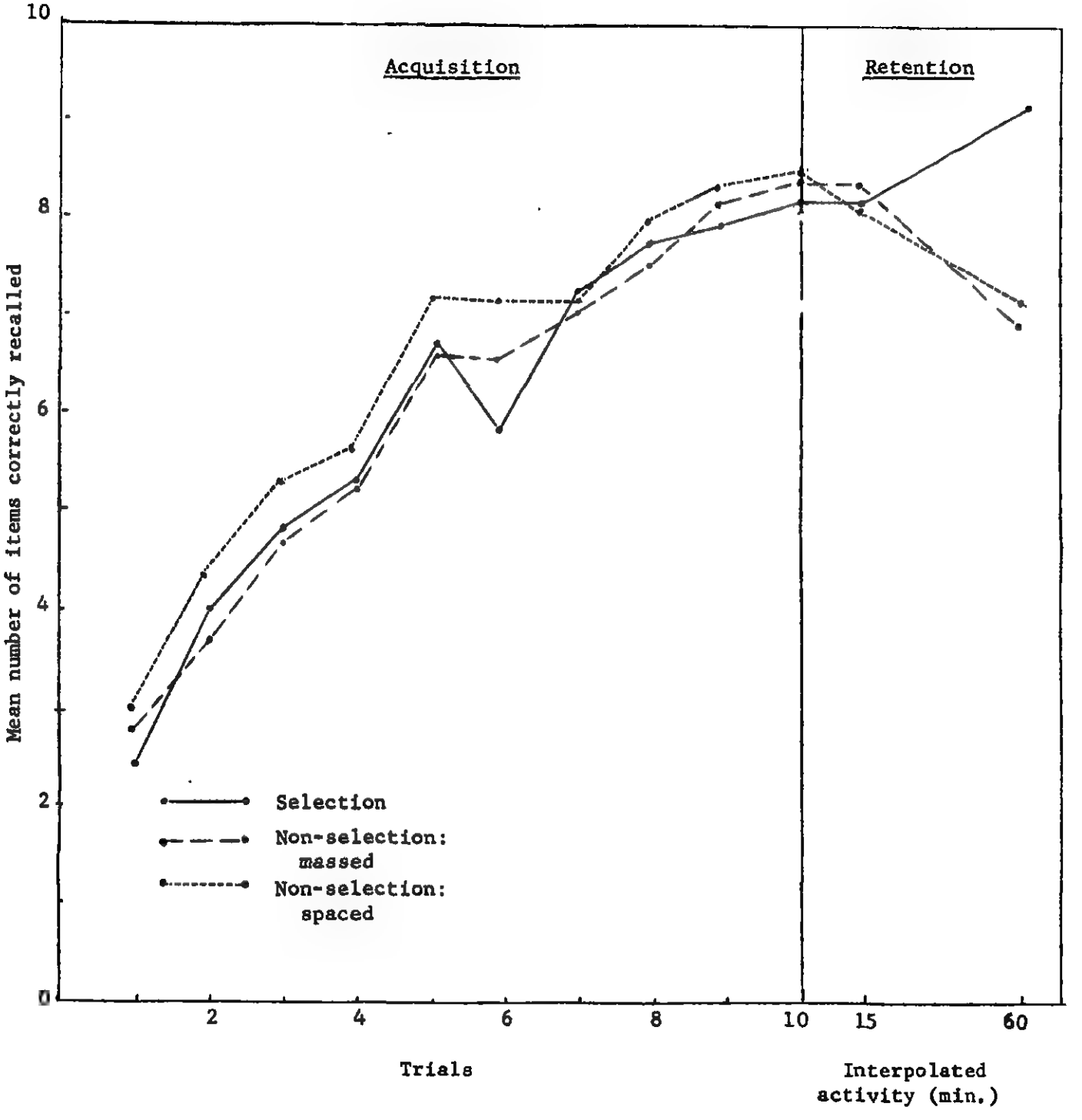

Figure 1. Recall of intentional items

Results

Acquisition. The learning curves presented in Figure 1 indicate that no differences exist in preformance under the three conditions of acquisition. Over the 10 trials Ss in the S condition were quite similar to Ss in either N group in recalling the intentional items. The mean number of items learned at the last practice trial was 8.2 for the S group, 8.5 for the Nm group, and 8.5 for the Ns group. The analysis of variance of the three curves over the 10 trials indicates that the only significant F was based on trials. A separate analysis of variance indicated that there is no significant difference between the Nm and Ns groups. An F of .86 was obtained for the conditions of learning.

Retention. In Table 3 the number of items learned at the last practice trial and the mean number correctly recalled after 15 and 60 minutes of interpolated work is presented. Although there is virtually no forgetting after either interval for the S groups, the N groups drop decidedly.

TABLE 3

RECALL OF INTENTIONAL ITEMS AT THREE POINTS IN TIME AND UNDER THE THREE LEARNING CONDITIONS

Time of recall	Conditions of learning					
	Selection		Massed non-selection		Spaced non-selection	
	Interpolated time		Interpolated time		Interpolated time	
	15 min.	60 min.	15 min.	60 min.	15 min.	60 min.
Last trial	8.1	8.3	8.9	8.1	8.8	8.1
After 15 min.	8.2		8.4		8.2	
After 60 min.		9.1		6.9		7.1

To test the significance of these differences in retention two analyses of variance were performed. For both the 15 and 60 minute groups, the Ss'

recall at the last practice trial was compared with their post-interpolated activity recall. As significant interaction between the conditions of learning and the recall trials would indicate that the seemingly superior retention of the S group is a reliable finding. After 15 minutes there is no indication that the S group has superior retention. Table 4 shows that the interaction between conditions and trials is not significant.

TABLE 4

ANALYSIS OF VARIANCE OF THE NUMBER OF INTENTIONAL ITEMS RECALLED ON THE LAST PRACTICE TRIAL AND ON THE RETENTION TEST AFTER 15 MINUTES OF INTERPOLATED ACTIVITY UNDER THE THREE CONDITIONS OF LEARNING

Source of Variance	df	Mean Square	F	p
Learning conditions	2	1.25	.21	ns
S in the same group	31	5.90		
Time of recall	1	1.66	3.39	< .10
Learning conditons x time of recall	2	.70	1.43	ns
Pooled Ss x time of recall	31	.49		

However, after 60 minutes of interpolated activity the difference in retention is sharper and, as indicated in Table 5, the Conditions X Trials interaction does reach an acceptable level of significance. This means that retention remains relatively high after 1 hour of interpolated activity under selection learning conditions but not under any of the other experimental conditions. As a replication a second group of 13 Ss were

TABLE 5

ANALYSIS OF VARIANCE OF THE NUMBER OF INTENTIONAL ITEMS RECALLED ON THE LAST PRACTICE TRIAL AND ON THE RETENTION TEST AFTER 60 MINUTES OF INTERPOLATED ACTIVITY UNDER THE THREE CONDITIONS OF LEARNING

Source of Variance	df	Mean Square	F	p
Learning conditions	2	7.86	.72	ns
Ss in the same group	25	10.87		
Time of recall	1	5.29	7.90	< .01
Learning conditions x time of recall	2	3.82	5.70	< .01
Pooled Ss x time of recall	25	.67		

run under the S condition. Seven of these Ss were given 15 minutes of interpolated work and six Ss, 60 minutes of interpolated work. At trial 10, the former group recalled a mean of 8.8 items, the latter, a mean of 9.0 items. After their respective interpolated intervals, the former group recalled 9.1 items, the latter, 8.9 items. These replication groups are not included in the statistical analyses. They were run to increase confidence in the initial finding that there is little or no decrement in retention under S conditions.

Discussion

If the only data available were those for the learning trials, it must be concluded that the presence of incidental material and selection

processes had no effect on intentional learning. In the light of the differences in the conditions of learning, this in itself is an interesting finding. The results regarding retention, however, show strong differences in favor of the S group after 1 hour of interpolated activity. The explanation of these differences must simultaneously account for the lack of differences in learning. Thus, if the presence of the incidental items and of a selection cue affect retention, they probably also affect acquisition. The fact that no differences in learning are evident makes it reasonable to assume, as a first approximation, that there may exist at least two sets of factors which cancel each other during acquisition but not during subsequent performance.

One factor, interference resulting from the learning of the incidental items, has already been discussed. These incidental associations may compete with the intentional associations and, thereby, disrupt performance during acquisition. However, according to McGeoch (1942, p. 143), interference tends to dissipate after practice. As a result, selectors demonstrate better retention after an interpolated interval than non-selectors. Yet on the basis of the interference process alone, it would be expected that selectors manifest poorer performance in acquisition than non-selectors. The data reveal no difference among the groups during learning. To account for this, it is necessary to postulate a second factor. This factor refers to a process which must <u>facilitate</u> learning. It does not appear in acquisition because performance is disrupted by interference. If interference were reduced during acquisition then the facilitation process should appear in the form of a higher learning curve for selectors than for non-selectors. Only after the dissipation of interference does the superior learning under S show itself.

Although it seems that the data reported above logically require the postulation of these two sets of processes, the validity of the postulation must in the last analysis rest on direct evidence that such processes do in fact operate in selection learning. There are experimental results to support the assumption of an interference factor based on incidental learning. It has been found that incidental learning produces retroactive inhibition (Postman and Adams, 1956a). However, there is no direct evidence in the literature as to what may give rise to facilitation processes in selection learning. Nevertheless, hints exist. These all point to the type of selection cue utilized. They suggest that a selection cue such as the odd-even property of the digits directs attention to attributes of the items which are relevant to the recall task. By virtue of attention to these attributes acquisition is facilitated.

Several experiments were reviewed in the introduction on the crowding and isolation of nonsense syllables and numbers (Von Restorff, cf. Osgood, 1953, p. 567; Siegel, 1943; Postman and Phillips, 1954). They demonstrated that as items in a serial list become more discriminable, errors decrease and learning is facilitated. Discriminability was manipulated identically in each of these studies. Items of high discriminability were either a number interspersed among nonsense syllables or a syllable interspersed among numbers. The attribute of being a number surrounded by nonsense syllables or of being a nonsense syllable surrounded by numbers is a highly important cue to the learner. It not only increases discriminability but also induces the person to attend to attributes which will aid correct reproduction. If the discriminability of the items was manipulated by color differences or differences in the size of letters or numbers, attention would be directed to attributes which do not facilitate recall. The size or color of the items

is irrelevant to accuracy in the recall tasks of the above experiments. Discriminability of cues, per se, is important in such tasks as identification or sorting. If the person must identify the items in terms of "that's it," i.e., a pointing or identifying response (Gibson and Gibson, 1955), his accuracy will be determined by the similarity of the items in respect to that attribute which functions as a cue for pointing or identifying. A high degree of similarity among items in respect to this attribute would lead to a low degree of accuracy. The particular attribute which does function as a cue would in such tasks have little consequence independent of its discriminability. On the other hand, when the task requires that the item be reproduced, the particular attribute which functions as a cue may be highly important, independent of its discriminability. If the cue directs attention to properties of the item important for accurate reproduction, better performance may occur than when attention is directed by cues irrelevant to accurate reproduction. In fact, recently Postman and Phillips (1954), using Von Restorff's paradigm of crowded and isolated items, have shown that the addition of color differences, irrelevant to recall performance, acted as a source of interference, decreasing the isolation effect "...because it leads the learner to respond to stimulus features that are irrelevant to the learning task" (Postman, Adams and Bohm, 1956). It seems, therefore, that in learning, as measured by verbal recall, variations along one stimulus dimension may not have the same effect as a seemingly equal variation on another dimension. On the basis of such evidence it is conjectured that the facilitation factor depends on the type of selection cue, and it is the purpose of future experiments to examine the effectiveness of different selection cues on learning and recall.

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